EXHIBIT E

Excerpts of Howell Deposition

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IN THE UNITED STATES BANKRUPTCY COURT

FOR THE DISTRICT OF DELAWARE

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In re: Chapter 11

FTX TRADING LTD., et al.,   Case No. 22-11068

        Debtors.   (JTD)

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DEPOSITION OF SABRINA HOWELL

Monday, February 26, 2024

Traci M. Mertens, RDR, CRR, CSR

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1   VIDEOTAPED DEPOSITION OF SABRINA HOWELL,
2   produced, sworn, and examined on February 25, 2024,
3   before Traci M. Mertens, RDR, CRR, CSR.
4   IT IS HEREBY STIPULATED AND AGREED by
5   counsel for that this deposition may be taken in
6   shorthand by Traci M. Mertens, a Certified Realtime
7   Reporter and Certified Shorthand Reporter, and
8   afterwards transcribed into typewriting, and the
9   signature of the witness is reserved by agreement of
10   counsel and the witness.
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1   SABRINA HOWELL: Witness herein, having been
2   duly sworn by the Stenographer,
3   testified as follows:
4
5   *   *   *
6
7   EXAMINATION
8   BY MR. ROSELIUS:
9   Q. Good morning, Professor. My name's Joe
10   Roselius. I'm from DLA Piper, and I represent Maps
11   Vault today.
12   Could you please state and spell your full
13   name for the record.
14   A. Sabrina, S-A-B-R-I-N-A, Howell,
15   H-O-W-E-L-L.
16   Q. Have you ever been deposed?
17   A. I have not.
18   Q. Have you ever testified in court?
19   A. I have not. Oh. Sorry. Yes, I have, on
20   January 31st.
21   Q. Okay. Any other court testimony other
22   than that?
23   A. I testified in the House of
24   Representatives. It's not a court, but it's the
25   only other testimony I've given.

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1   Q. So even though you've testified in court
2   before, a deposition is similar but slightly
3   different. I just want to give you some ground
4   rules, mostly to help us keep a clean transcript and
5   to help out our court reporter.
6   First of all, you're under oath today. Do
7   you understand that?
8   A. I do.
9   Q. The same penalty of perjury applies as if
10   we were testifying in court even though we're in a
11   conference room with no judge here.
12   Do you understand that?
13   A. I understand.
14   Q. You're obligated to answer fully and
15   fairly all of the questions you're asked today.
16   Do you understand that?
17   A. I understand.
18   Q. A transcript of your testimony's being
19   prepared and may be used as evidence in this matter.
20   Do you understand that?
21   A. I understand.
22   Q. Please make sure that you answer out loud
23   because the court reporter can't take down a head
24   nod or a head shake, so -- she can't take that down,
25   so you have to answer yes or no.

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1   A. I understand.
2   Q. Please try to wait for me to finish
3   answering -- or asking my question before you answer
4   it even if you think you know where I'm going. By
5   the same token, I will try to wait for you to finish
6   your answer before I ask my next question so we
7   don't have a lot of crosstalk.
8   Is that fair?
9   A. That sounds like a good plan.
10   Q. If you do not understand one of my
11   questions, please let me know. If you answer it, I
12   will assume that you understood it.
13   Is that fair?
14   A. Yes.
15   Q. If you need a break, please let me know.
16   The only thing I ask is that you answer any question
17   that's pending before we take a break.
18   A. I understand.
19   Q. And there may also be some objections made
20   to preserve the record. Unless you are instructed
21   not to answer, you still have to answer, even if
22   there's an objection.
23   Do you understand that?
24   A. I understand.
25   Q. Have you taken any courses in asset

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1   valuation?
2   A. Not explicitly on asset valuation.
3   Q. What do you mean by that?
4   A. I have a Master's in economics from
5   Harvard University and a Ph.D. in the Political
6   Economy & Government Program economics track from
7   Harvard University. And as part of my course work
8   for those degrees, we studied basic valuation; for
9   example, in the core finance seminar, but I did not
10 take a class explicitly concerning asset valuation.
11   Q. Have you taken any classes, whether in --
12 as part of your education or since then, about
13 valuation of cryptocurrency?
14   A. I have not. When I was studying, such
15 classes, as far as I am aware, did not exist.
16   Q. Okay. When did you get your Ph.D.?
17   A. In 2015.
18   Q. When was Bitcoin invented?
19   A. In 2009.
20   Q. There were no classes about it at that
21 time?
22   A. There were not. As far as I know, the
23 fintech class that I created at NY Stern in 2016 was
24 among the first fintech classes at any top business
25 school in the country.

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1   Q. Do you teach anything about valuation of
2   cryptocurrency as part of the classes that you
3   teach?
4   A. I do.
5   Q. What specifically do you teach about asset
6   valuation?
7   A. As one example, I created a class session
8   about valuing and understanding non-fungible tokens
9   or NFTs, which there are quite a bit of
10 resemblance to some of the tokens at issue in this
11 matter. We talked about valuing the future cash
12 flows associated with those NFTs and
13 distinguishing between fundamental valuation and
14 pricing-based valuation, given the bubble-like
15 characteristics of that market.
16   Q. Which tokens do you think are similar to
17 NFTs?
18   MR. GLUECKSTEIN: Object to the form.
19   Q. (By Mr. Roselius) You can answer.
20   A. All of these tokens are smart contracts
21 that are based on either the -- in the case of the
22 at-issue tokens, the Solana blockchain; in the case
23 of some NFTs, the Ethereum blockchain, and as
24 such, they are similar.
25   Q. You're familiar with the Kyle and

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1   Obizhaeva model?
2   A. I am.
3   Q. Do you teach that as part of your classes?
4   A. I do not.
5   Q. Why not?
6   A. Because in my fintech class, the question
7   of liquidating holdings of digital assets and
8   needing to account for the price impact of such a
9   liquidation is not part of the course material.
10   Q. Do you have any work experience related to
11 asset valuation?
12   A. I worked as an economic consultant as
13 Charles River Associates in 2008 and 2009 and
14 contributed to valuing oil pipeline assets for a
15 major oil company.
16   Q. Does that have anything to do with
17 valuation of cryptocurrency?
18   A. There are common elements in any valuation
19 exercise. You know, understanding the difference
20 between fundamental value and price-based value
21 would be one example, but in general, no. Oil
22 pipelines do not have too much in common with
23 cryptocurrencies.
24   Q. What's the difference between fundamental
25 value and price-based value?

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1   A. Fundamental value reflects future cash
2   flows generated by the asset whereas price-based
3   value reflects what the market is willing to pay at
4   a given moment.
5   Q. Are you offering any opinions about
6   fundamental value of MAPS or OXY or Serum?
7   A. In my estimates of an asset liquidation
8   discount and a discount for lack of marketability
9   for these at-issue tokens, I do not, as part of my
10 assignment, opine specifically on their fundamental
11 value. As input into my calculations in order to
12 try to apply a consistent method for discounting
13 every single digital asset outside of FTT, I was
14 specifically asked to consider fundamental value.
15   However, I do in my rebuttal reports opine
16 on the fundamental value of these assets as it might
17 likely have been assessed on petition time in order
18 to rebut the claims by Mr. Konstantinidis and
19 Mr. Ghatzinas that, in particular, liquidity and
20 volumes would likely have persisted and increased in
21 the future and that market depth would have invoked
22 liquidation in Mr. Konstantinidis' case without any
23 pricing impact whatsoever following the petition
24 date since ex-post events are very much contrary to
25 that assumption.

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1 exception which is the fact that I assessed in my
2 initial report the fundamental value of FTT to be
3 zero relied on the way I defined tokens in the ICO
4 paper.
5   Q. Why did you use CoinMarketCap for the ICO
6 paper?
7   A. At the time I was collecting data in early
8 2017, the industry was much less mature, and Coin
9 Metrics had either just been founded or wasn't yet
10 founded and didn't cover a large range of assets and
11 didn't have the high quality reputation among
12 financial institutions that it does today. Instead,
13 the only, in our view, real player in the game was
14 CoinMarketCap which had been around in 2013 and
15 covered a wide range of assets.
16   The immaturity of the industry is relevant
17 because at that time, there were, as far as I know,
18 no academic papers on the prevalence of wash
19 training for fraudulent volume on cryptocurrency
20 exchanges, and so we could not incorporate such
21 information. I'm not even sure if market
22 participants were engaged in as much wash trading as
23 they were in later years.
24   And finally, the purpose of the data
25 gathering exercise in the ICO paper was different

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1 from the data gathering exercise for my analysis in
2 this matter in that there we wished to cast as wide
3 a net as possible and, in fact, wanted to include
4 esoteric tokens that were scams or frauds precisely
5 in order to correlate the characteristics of those
6 projects relative to higher quality projects with
7 outcomes.
8   Whereas in this matter, I was interested
9 in taking an inclusive approach to identifying
10 liquidity that could reasonably absorb sales of the
11 debtor's holdings, and thus, wanted to balance a
12 source of data that would include legitimate trading
13 so as not to be dominated by wash trading with also
14 trying to be, again, conservative and inclusive in
15 my choice of exchanges.
16   And so I didn't want to use CoinMarketCap
17 because the additional exchanges that CoinMarketCap
18 covers relative to the Coin Metrics dataset are very
19 low trust and are known to be dominated by wash
20 trading.
21   Q. The wash trading that you're talking about
22 is based on the exchange, not the token, is that
23 correct?
24   A. Correct.
25   Q. Do you have any evidence -- have you seen

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1 any evidence of wash trading in MAPS or OXY or
2 Serum?
3   A. I believe that the measures of wash
4 trading that have been established in the literature
5 apply across all significant tokens on the
6 exchanges.
7   Q. That wasn't my question. My question is
8 have you seen any evidence of wash trading in MAPS
9 -- I'll just break them apart. We'll do all three.
10   Have you seen any evidence of wash trading
11 in MAPS?
12   A. No.
13   Q. Have you seen any evidence of wash trading
14 in OXY?
15   A. No.
16   Q. Have you seen any evidence of wash trading
17 in Serum?
18   A. No.
19   Q. What is the source of the term asset
20 liquidation discount?
21   A. It's a term that I use to describe the
22 discounts from liquidating assets, so I just put
23 those words in a different order.
24   Q. So did you come up with the term?
25   A. I don't recall if the first use of the

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1 three words in that order was on my part or on the
2 part of my collaborators at Analysis Group, but it
3 was one of us.
4   Q. So is that a standard term in the
5 valuation industry?
6   A. Yes. I think you will find it.
7   Q. Do any of the articles you relied on refer
8 to an asset liquidation discount?
9   A. I can't recall. I'd have to go through
10 them.
11   Q. So you can't point to anything before you
12 -- either you or someone at Analysis Group came up
13 with the term?
14   A. I think the concept of selling holdings
15 and having an impact on price from those sales is
16 very well established, is, for example, the subject
17 of the Kyle and Obizhaeva papers that I cite, and so
18 I'm very comfortable with using this term to
19 describe sales of positions and associated price
20 impact, for example, in the Kyle and Obizhaeva
21 paper.
22   Q. Does the Kyle and Obizhaeva paper refer to
23 an asset liquidation discount? The 2016 paper, I
24 mean.
25   A. They primarily refer to transaction costs.

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1   Q. Do they use the term discount at all in
2   the paper?
3   A. No, but I don't think that's relevant to
4   my use of the model in this matter.
5   Q. So are transaction costs and the discount
6   identical?
7   A. Yes. They are different words for the
8   same percent of price.
9   Q. So the entire discount you applied in this
10 case is based on transaction cost?
11   MR. GLUECKSTEIN: Object to the form.
12   Q. (By Mr. Roselius) You can answer.
13   A. Entire discount -- you're just referring
14 to the asset liquidation discount right now --
15   Q. Correct.
16   A. -- and discount for lack of marketability?
17 Yes. The Kyle and Obizhaeva model has two
18 components, a bid ask spread cost and a price impact
19 cost, and those two together are the transaction
20 costs which are a percent of the price. It's a
21 percent of costs, and I refer to that as a discount.
22   However, it would be equally correct to
23 have referred to it throughout as a percent of
24 petition date press.
25   Q. If you have an asset that has a price of

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1   $100 and a discount of 50 percent, how much is that
2   asset worth, in your opinion?
3   MR. GLUECKSTEIN: Object to the form.
4   A. Taking 50 percent off of $100 is $50.
5   Q. (By Mr. Roselius) Again, assume the price
6   is $100. The discount is 75 percent. How much
7   would it be worth?
8   A. $25.
9   Q. If it's a hundred percent?
10   A. Zero dollars.
11   Q. What if it's 200 percent?
12   A. Zero dollars because we do not believe
13 it's reasonable to have negative customer claims
14 values.
15   Q. Why not?
16   A. So I believe that Mr. Konstantinidis may
17 have made a mistake in looking at the formula
18 because he suggests that we are truncating discounts
19 at zero and 100 percent and somehow that's a
20 problem.
21   In fact, with positive holdings in
22 positive places, you can't have negative discounts.
23 And having the formula produce more than a hundred
24 percent reflects the intense illiquidity of these
25 markets relative to their daily trading volume.

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1   And so -- and it is, in fact, much more
2   plausible that they would produce more than a
3   hundred percent discount, that would have to be
4   truncated at a hundred percent, then the models that
5   Mr. Konstantinidis uses which are arbitrarily capped
6   at 32 percent for one of the models, and for the
7   other one has the bizarre implication that actually
8   the discount declines at longer horizons.
9   Q. So how did you -- you capped the discount
10 at a hundred percent, regardless of what the model
11 put out, correct?
12   A. Correct.
13   Q. So even if you changed some of the inputs
14 and the output of the discount model that you used
15 changed, you still left it at a hundred percent?
16   A. That's correct.
17   Q. And I know you just talked about whether
18 the discount could be negative. You're referring to
19 a discount that is negative, not a discount that's
20 200 percent.
21   A. Correct.
22   Q. Okay. So with respect to discounts that
23 are over 100 percent, those still get capped at a
24 hundred percent?
25   A. That's correct.

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1   Q. Because it doesn't make sense to have a
2   200 percent discount?
3   A. We -- I do not believe having the
4   customers pay the estate is part of the scope of the
5   liquidation process in bankruptcy.
6   Q. Well, why would the customers have to pay
7   the estate if the discount is over a hundred
8   percent?
9   A. Well, just that -- if the position were
10 somehow, you know, to be negative.
11   Q. The tokens don't --
12   A. It's -- it's pretty standard in these
13 models that with extreme volatility -- with, you
14 know, high volatility and these extraordinarily
15 large holdings relative to daily trading volume that
16 would not plausibly exist in a normal market,
17 environment.
18   For example, in the case of MAPS where
19 holdings are 20 -- almost 20,000 times daily trading
20 volume, it is natural that the formula would produce
21 a discount of over a hundred percent, and we then
22 truncated at 100 percent. It does not mean that the
23 formula is incorrect in any way, that it produces a
24 discount of over 100 percent.
25   Q. But why truncate it, then?

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1   A. It would have -- it could have been
2 reasonable to report the discounts produced by the
3 model, but I don't think that that would have been
4 the most useful way to present the results since we
5 are, as I mentioned, not suggesting that claims
6 could have -- would have negative value.
7   Q. Did you say --
8   A. And to be clear, the discount is a way of
9 thinking about the ability of markets and the depth
10 that exists in markets to absorb debtor holdings.
11 That's where the discount is coming from. It's not
12 from a fundamental value of, for example, the
13 tokens' future cash flows themselves.
14   Q. So is it your opinion that if the KO model
15 output a discount of 70,000 percent that that means
16 the tokens have negative value?
17   A. No. That's what I was just getting at is
18 that the purpose of the model is to understand the
19 likely impact on the price of selling the holdings.
20   And so when you have holdings that are,
21 you know, in this case 6,000, 20,000 times daily
22 trading volume, they would drive -- selling those
23 holdings would, in practice, drive the price quickly
24 to zero, and it would remain at zero.
25   The formula produces a discount in excess

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1 of a hundred percent, and that represents, in a
2 sense, the inability of these markets to
3 realistically absorb the quantity of debtor
4 holdings.
5   Q. Does the price ever go below zero?
6   A. No.
7   Q. How does the KO model work? Can you just
8 explain it to me?
9   MR. GLUECKSTEIN: Object to the form.
10   Q. (By Mr. Roselius) You can answer.
11   A. There are two components to the KO model.
12 One is a bid out spread cost, and one is a
13 transaction cost. I'm sorry. One is a price impact
14 cost. Together, they form the transaction cost.
15 Each term is associated with a coefficient that KO
16 has calibrated using data on portfolio transitions.
17   But it's all laid out in the appendix of
18 my initial report, so I'd be happy to talk through
19 that more specifically.
20   Q. Does the KO model measure anything other
21 than the bid ask cost and the price -- you said the
22 bid ask cost, and what was the other one?
23   A. The price impact.
24   Q. The price impact. Does it measure
25 anything else?

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1   A. Do you mean what are the specific -- just
2 to be clear, like, what are the specific components
3 of the formula?
4   Q. Well, I'm asking you to explain your
5 opinion, not what's in your report.
6   MR. GLUECKSTEIN: Just answer what you
7 know. Tell him what you recall.
8   A. The required inputs to the KO formula are
9 regular trading volume, regular volatility, the
10 price, and the holdings to be sold. And the
11 remaining terms in the formula are calibrated
12 estimates by KO that translate those objects I just
13 described into a transaction cost that would be
14 incurred from selling those holdings at a market
15 equilibrium defined natural speed of trading.
16   Q. How are the estimates calibrated?
17   A. They are calibrated using data from the
18 NASDAQ and the New York Stock Exchange in the early
19 2000s.
20   Q. Has anyone ever tried to calibrate the KO
21 model with tokens?
22   A. In a 2021 paper published in the Journal
23 of Banking and Finance, which is a high quality
24 journal, it shows that liquidity measure from KO
25 characterizes digital asset markets better than

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1 available alternatives.
2   Q. You said it was a high quality journal.
3 Is it the same level of quality as, say,
4 Econometrica?
5   A. Not quite so high quality.
6   Q. How do you define high quality?
7   A. Both of those journals are well
8 established, peer reviewed. Econometrica is what's
9 called a top five economics journal and is, you
10 know, one of the -- it's probably the very, very top
11 journal for new methods. The Journal of Banking and
12 Finance is a high quality journal for financial
13 economics. Unlike Econometrica does not have so
14 much prestige in the economic side of the field, but
15 it is -- for example, it would be included in a
16 candidate for tenure's packet as a, you know, top
17 finance publication at most departments.
18   Q. If Econometrica is a top five journal,
19 where would you rank the Journal of Banking and
20 Finance, approximately? The top 100?
21   A. In a finance department or in an economics
22 department?
23   Q. For both.
24   A. I can only speak to a finance department
25 where I sit on a promotion and tenure committee, and

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1   I would say it is top ten.
2   Q.   In finance?
3   A.   In finance.
4   Q.   What about economics?
5   A.   At the very tippy-top departments, I'm --
6   you know, I really can't speak to that because I
7   don't have any experience as a professor in an
8   economics department.
9   Q.   Why did you choose the KO model?
10   A.   The KO model was the alternative that had
11   the strongest grounding in economic theory that was
12   built on insights designed to be applied across
13   diverse type markets and asset classes and was
14   conservative in the discounts it yielded relative to
15   other methods.
16   Q.   Did you choose the KO model before you saw
17   the results of the different models?
18   A.   No. We estimated, as I mentioned earlier,
19   three or four alternatives for asset liquidation
20   discounts at the same time, and I ultimately settled
21   on the KO 2016 model as the most defensible option.
22   Q.   What do you mean by most defensible?
23   A.   In that it is best grounded in economic
24   theory and arguably applicable to digital asset
25   markets.

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1   Q.   Why do you say it's applicable to digital
2   asset markets?
3   A.   The authors describe their formula as a
4   universal model of market impact because it is
5   derived from these market microstructure invariance
6   hypotheses which apply across asset classes.
7   They note in their original paper that the
8   formula can apply to commodities, to foreign
9   currency exchange, to fixed income markets, and then
10   the two authors themselves use exactly the same
11   calibrated formula in follow-on work with data on US
12   treasuries, on corporate bonds, and on historical
13   stock market crashes going back to 1929.
14   They point out that market structure
15   characteristics such as in-person trading versus
16   electronic trading or tick sizes or information
17   asymmetry should not affect the invariance
18   hypotheses that the formula relies on and that it is
19   correct to apply to those diverse markets.
20   And I would speculate that, in fact, these
21   digital asset markets are -- have more market
22   microstructure similarity to stock markets than some
23   of these other markets to which KO has applied their
24   theory, though that is, sort of in a sense,
25   fundamentally untestable.

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1   Q.   So you're saying it's impossible to test
2   whether the KO model applies to cryptocurrency
3   markets?
4   A.   No. That is not what I meant. In fact, I
5   conducted analysis that tested the invariance
6   hypothesis in my data on cryptocurrency markets and
7   found that it broadly held, though the data are
8   noisy.
9   And furthermore, Brauneis 2021, as we
10   previously discussed, actually shows that the
11   liquidity measure characterizes digital asset
12   markets well.
13   Q.   Characterizes markets but not values?
14   A.   Characterizes liquidity which is what
15   we're interested in for this matter.
16   Q.   What other models did you consider for the
17   asset liquidation discount?
18   MR. GLUECKSTEIN: Objection; asked and
19   answered.
20   Q.   (By Mr. Roselius) You can answer.
21   A.   I considered several alternative models
22   including the square root model, the Amihud 2002
23   model, the Kyle Madhavan, M-A-D-H-A-V-A-N, model.
24   Q.   Do any of those other models produce
25   discounts above 100 percent for MAPS and OXY?

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1   A.   I would need to go and look at the
2   analytical results to be sure, but I believe so.
3   Q.   Which ones?
4   A.   I don't recall off the top of my head, but
5   we have all of that material.
6   Q.   Are you familiar with the term blockage
7   model?
8   A.   If we -- sorry. Go back. If we look at
9   Figure, I think, 5 of the rebuttal report -- yes.
10   So here in Figure 5, you see that using almost all
11   of the other methods, the discounts are always --
12   sorry. Using all of the other seven methods, the
13   discounts are invariably a hundred percent for MAPS
14   and OXY. And I'm reasonably sure that in almost, if
15   not all of those cases, the models are producing a
16   more than 100 percent discount that we're truncating
17   at 100 percent.
18   Q.   Why truncate the discount at 100 percent?
19   A.   Because the purpose of the exercise is to
20   understand the likely impact on the price of
21   liquidating the holdings, and as we've discussed,
22   the price can't go below zero.
23   These formulas do produce discounts in
24   excess of a hundred percent. That doesn't mean that
25   they are wrong. It just means that we have a case

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1 of extreme illiquidity where holdings are many
2 thousands of times daily trading volume, and thus,
3 in practice, the price would almost -- would most
4 likely quickly go to zero. That is what is being
5 captured by these very high liquidation discounts.
6   Q. Does the price go to zero on the first
7 token?
8   A. Not necessarily.
9   Q. What do you mean by that?
10   A. It is true that for the tokens at issue,
11 there's a positive market price, and presumably one
12 could sell one token at a positive price. From the
13 perspective of the value of the customer claims at
14 issue here for the debtor's holdings, the share of
15 tokens that could be sold at a positive price is so
16 small as to be negligible and could potentially
17 round to zero with a reasonable number of digits
18 after the decimal point. Therefore, I assign a
19 hundred percent discount.
20   Q. But it has a positive price, correct?
21   A. What is it?
22   Q. The token. The tokens here.
23   A. The tokens have a positive price.
24   Q. At what point how many tokens have to be
25 sold for the price to go to zero? For MAPS; let's

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1 be specific.
2   A. My estimates do not produce that number.
3   Q. What about for OXY?
4   A. Again, my estimates do not produce a
5 number of tokens that could be sold.
6   Q. A million tokens?
7   A. Again, I cannot speculate.
8   MR. GLUECKSTEIN: Object to the form.
9   A. I cannot speculate. However, I think it
10 would be reasonable to, in fact, suppose that it
11 would be difficult to find traders on the other side
12 of this liquidation process, once it's started, for
13 the at-issue tokens given the very large amount of
14 holdings to be sold.
15   So I think it -- although I have not done
16 this type of analysis, I would speculate that the
17 price would very quickly go to zero.
18   Q. How quick?
19   A. That, I cannot speculate on. It was
20 outside the scope of my analysis.
21   Q. Could you sell a million dollars worth of
22 MAPS before it goes to zero?
23   A. It would depend on market beliefs and
24 expectations.
25   Q. Could you sell $5 million worth of MAPS

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1 before it goes to zero?
2   A. Again, it would depend on market activity,
3 beliefs, and expectations.
4   Q. Could you sell $20 million before it goes
5 to zero of MAPS?
6   A. I would apply the same rule. And just to
7 illustrate why I believe market expectations are
8 important is that it would depend on, for example,
9 if the debtor announced that it's only selling 10
10 tokens and will destroy the remaining tokens, which
11 would be contrary, as I understand, to the
12 requirement as part of this bankruptcy proceedings
13 that all of the individual assets be liquidated,
14 regardless of the basis of the customer claims.
15   So in that case where, again, the debtor
16 has said we're going to sell 10 tokens and destroy
17 the remainder, one could imagine selling those 10
18 tokens at a positive price. That's common sense.
19   The analysis that I was asked to conduct
20 was to assess what would happen if the debtor
21 started to liquidate all of his holdings, and once
22 the market knows that the debtor is starting that
23 liquidation process, there would be an interplay
24 between that information and actual sales that would
25 determine when the price would go exactly to zero.

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1   Q. And that is some point after the tokens
2 start to be sold, is that correct?
3   A. I would expect so.
4   Q. So my question to you is with respect to
5 MAPS and OXY, at what point does the price go to
6 zero?
7   A. I cannot speculate, but my analysis
8 suggests that the overall proceeds to the estate
9 would be negligible and essentially rounding to zero
10 from the perspective of the large amount of holdings
11 of the debtor, around 400 million for OXY, a billion
12 for MAPS, and 3.7 billion for Serum.
13   Q. But it's not equal to zero, correct?
14   A. It's not exactly equal to zero.
15   Q. So again, my question is: Is it more or
16 less than $100 million?
17   A. I cannot speculate on specific amounts.
18   Q. More or less than $25 million for MAPS and
19 OXY each?
20   A. I have not done the analysis to speculate
21 on such amounts.
22   Q. What is a blockage model?
23   A. Can you elaborate?
24   Q. Well, that's what Mr. Konstantinidis calls
25 his model, right?

16 (Pages 58 to 61)

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1   A. A block -- someone is selling blocks of
2   shares? Block trading?
3   Q. Yeah. Sure.
4   A. Yes. He assumes a gradual liquidation
5   process.
6   Q. What's the difference between a blockage
7   model and a slow trading model?
8   A. Mr. Konstantinidis assumes that each
9   customer could sell 10 percent of daily trading
10 volume every day indefinitely, so that means in the
11 case of MAPS and OXY that 20 percent and 30 percent
12 of daily trading volume are being sold every day
13 without any price impact.
14   And those 20 and 30 percent are blocks
15 that are sold each day, and selling sort of large
16 positions is often called a block trade, which is
17 sometimes split up into multiple orders.
18   The slow trading model that is assumed in
19 the Kyle and Obizhaeva method is the idea that
20 trading would take place at a natural speed
21 reflecting a market equilibrium outcome in which
22 traders wish to balance a desire for fast execution
23 with a desire to minimize transaction costs.
24   Q. So are you familiar with the block -- a
25 blockage model?

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1   A. If you're asking if I'm familiar with what
2   Mr. Konstantinidis does, I am.
3   Q. Is that a recognized model for valuing an
4   asset or -- let me say it differently.
5   Is that a recognized model for estimating
6   an asset liquidation discount?
7   A. I do not think that Mr. Konstantinidis'
8   assumptions are reasonable or supported by evidence.
9   It goes against common sense and basic financial
10 economics that one could sell 30 percent of daily
11 trading volume every day for years on end with no
12 price impact.
13   Q. That wasn't my question. My question is:
14 Is the model recognized?
15   A. As I understand, it is not conventional to
16 use a discount for lack of marketability to assess
17 price impact in liquidation, but I certainly cannot
18 exclude that market participants have done that in
19 the past.
20   Q. In the KO model, are you aware of any --
21 let me ask it differently.
22   Are you aware of any authoritative method
23 for valuing the asset liquidation discount for
24 cryptocurrency?
25   MR. GLUECKSTEIN: Object to the form.

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1   Q. (By Mr. Roselius) You can answer.
2   A. I believe the KO model is the best
3   available alternative that has been validated in
4   digital asset markets.
5   Q. And the validation is based on the
6   Brauneis paper?
7   A. As well as my own analysis.
8   Q. So you and Brauneis, is that correct?
9   A. That is correct.
10   Q. Has anyone else ever said it's an
11 authoritative method for valuing cryptocurrency?
12   A. I think it's important to clarify that the
13 exercise is not to value the cryptocurrency, but
14 rather, to assess the likely price at which the
15 debtor could sell his holdings of cryptocurrency
16 which is a very similar question to what has been
17 asked in many markets selling and buying assets that
18 look broadly similar like equities, fixed income,
19 treasuries.
20   And so as with regards to the question
21 that we are asking, the KO model is well validated
22 in a range of settings that are having some
23 resemblance to our setting and is, therefore, the
24 most appropriate choice to answer the question at
25 hand.

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1   Q. The Brauneis model examined only Bitcoin
2   and -- or BTC and ETH. Can we say it that way?
3   A. Yes.
4   Q. Did it examine any tokens like MAPS or OXY
5   or Serum?
6   A. It did not examine MAPS, OXY, or Serum.
7   Q. Did it examine any tokens like MAPS, OXY,
8   or Serum?
9   A. In a sense as cryptocurrencies, BTC and
10 ETH are similar, and importantly, were traded on
11 exchanges as assets in a very similar way as MAPS,
12 OXY and Serum were traded on those exchanges such as
13 on FTX or Binance, and so I believe they are
14 relevant comparables for the purpose that we are
15 after here in calculating the asset liquidation
16 discount.
17   Q. But the Brauneis paper did not examine any
18 tokens, correct?
19   A. Correct.
20   Q. In the Brauneis paper, they say that the
21 Kyle and Obizhaeva 2016 estimate performs rather
22 well in the low volume periods, but it's unable to
23 track liquidity across high volatility periods.
24   Are you estimating a low volatility
25 period -- a low volume period or a high volatility

17 (Pages 62 to 65)

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1 period in your opinion?
2   A. You said a low volume period or a high --
3 you mean a low volatility period and a high
4 volatility period or low volume or high volume?
5   Q. We'll come back to it. I may have written
6 it down wrong.
7   Would you agree that cryptocurrency in
8 general is highly volatile?
9   A. Yes.
10   Q. And that MAPS and OXY and Serum are highly
11 volatile?
12   A. Yes.
13   Q. So the quote is from Brauneis is that the
14 Kyle and Obizhaeva 2016 estimator performs rather
15 well in the low volume periods but is unable to
16 track liquidity across high volatility periods.
17   A. So I chose an estimation period --
18   MR. GLUECKSTEIN: I'm sorry. Is there a
19 question? That's a quote.
20   Q. (By Mr. Roselius) Can you explain that?
21   A. It is natural for estimators to perform
22 better or worse across different ranges of these
23 measures.
24   Q. And according to Brauneis, the KO 2016
25 model is unable to track liquidity across high

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1 volatility periods.
2   Do you agree with that?
3   A. I'm not sure unable is the right way to
4 characterize this, but that is exactly why I chose
5 an estimation period of one year beginning on
6 November 2nd, 2021 and going to November 1st, 2022
7 to capture volatility and volume on a typical
8 trading day across market cycles and to avoid the
9 period of, you know, exceptional uncertainty that
10 preceded the petition time.
11   Q. Do you agree with Brauneis that KO 2016
12 is, quote, unable to track liquidity across high
13 volatility periods, end quote?
14   A. I don't think that that quote invalidates
15 the use of KO as the best available alternative for
16 these assets.
17   Q. So Brauneis, which is the only thing other
18 than your opinion that applies the KO model to
19 cryptocurrency says it's unable to track liquidity
20 across high volatility periods, correct?
21   A. So the fact that KO has been validated in
22 digital asset markets is not the sole basis for
23 using it in this exercise. Instead, it is KO's
24 assertion that they offer a universal formula of
25 market impact that applies across a range of

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1 different assets and markets that makes it the best
2 option here, and in practice, a more conservative
3 option than other approaches to these price
4 impact-based discount.
5   MR. ROSELIUS: Could you read back my
6 question?
7   (The preceding question was read back as
8 requested.)
9   Q. (By Mr. Roselius) Could you answer my
10 question?
11   A. It is correct that the paper states that.
12   Q. And you relied on Brauneis -- the Brauneis
13 paper -- I'm not sure it's pronounced. Brauneis.
14 We'll go with that.
15   You relied on that to support your
16 opinion, is that correct?
17   A. It is one of a number of reasons that I
18 used to support my choice of the KO model.
19   Q. And --
20   A. And to be clear, I don't -- I am not aware
21 of what Brauneis means exactly by high volatility,
22 but I expect that my approach of using a relatively
23 long estimation period ensures that idiosyncratic
24 events causing exceptionally high volatility do not
25 bias my estimates.

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1   Q. Other than Kyle and Obizhaeva, has anyone
2 else said that the KO model applied universally?
3   MR. GLUECKSTEIN: Object to the form.
4   Q. (By Mr. Roselius) You can answer.
5   A. I do not know of any other sources, but
6 given that KO is peer reviewed in the top methods
7 journal in economics and finance, I trust that it is
8 an accurate statement.
9   Q. No other source has described the KO model
10 as described -- as applying universally, correct?
11   MR. GLUECKSTEIN: Object to the form.
12   Q. (By Mr. Roselius) You can answer.
13   A. I don't know of any paper that has -- I
14 don't know whether any other paper has used the word
15 universal, off the top of my head, but it has been
16 cited and employed in other peer-reviewed literature
17 since it was published.
18   Q. No other paper has said that it applies
19 universally, correct?
20   A. I don't know. I have not read and recall
21 every single word from every paper that has ever
22 cited KO 2016.
23   Q. You're not aware of any paper that has
24 ever said -- other than KO themselves that's ever
25 said it applies universally, correct?

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1   MR. GLUECKSTEIN: Object to the form.
2   Q. (By Mr. Roselius) You can answer.
3   A. I am not aware of any specific papers that
4 say that.
5   Q. And in the Brauneis paper, they say,
6 quote, our results suggest that the measure used
7 should depend on the question being asked as there
8 is not, in parens, yet a universally best measure.
9   Do you agree with that?
10   A. I believe that of the alternatives
11 available to me that the data that I had at hand,
12 and given the question, the KO model was the best
13 choice. Rarely in economic analysis do we have the
14 perfect -- like, the perfect estimator that would
15 provide exactly the best solution in a sort of
16 Panglossian best state of the world.
17   Q. You agree that there is not a universally
18 best measure, correct?
19   MR. GLUECKSTEIN: Object to the form.
20   A. Again, I think the KO model is the best
21 alternative that is available to conduct this
22 analysis.
23   Q. (By Mr. Roselius) But there is no
24 universally best method, correct?
25   MR. GLUECKSTEIN: Object to the form.

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1   Q. (By Mr. Roselius) You can answer.
2   A. As far as I was concerned, with the models
3 that I knew about, it is the best in a universal
4 sense. I'm struggling here because it is, of
5 course, possible that future theorists will develop
6 a better model, but I did not have access to that
7 better model.
8   Q. It's a yes or no question.
9   MR. GLUECKSTEIN: It's not a yes or no
10 question. She's answered the question five times.
11 She's not giving you the answer you want. You can
12 ask it again, and then we need to move on. You've
13 asked it five times.
14   Q. (By Mr. Roselius) You're relying on
15 Brauneis, correct?
16   A. I am not relying exclusively on Brauneis.
17 Even if we were to remove Brauneis from
18 consideration, I still believe that the KO model was
19 the best available alternative for estimating asset
20 liquidation discounts.
21   I believe the market structure of digital
22 asset markets as they existed at the petition date
23 bears enough resemblance to the markets that KO had
24 used to make it a reasonable application.
25   Q. Was Brauneis looking at valuing individual

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1 digital assets or ranking exchanges?
2   A. Do you have a copy of the Brauneis paper
3 that I can see so we can discuss it in more detail?
4   Q. Are you not familiar with it?
5   A. I am familiar with it, but I read it last
6 -- several months ago, and I do not wish to misstate
7 what they did exactly.
8   Q. You didn't look at it before -- in
9 preparation for your deposition?
10   A. I did briefly skim it, but I don't recall
11 the details. And so if we are going to discuss it
12 in depth, I would like to have a copy.
13   (Exhibit 3 was marked for identification.)
14   Q. (By Mr. Roselius) You've been handed
15 what's been marked as Howell Exhibit 3 which is a
16 copy of the Brauneis paper.
17   A. Correct.
18   Q. So my question, Professor, was Brauneis
19 was ranking exchanges, not looking at individual
20 tokens, is that correct?
21   A. I believe their analysis is of the
22 individual Bitcoin and Ether cryptocurrencies.
23   Q. They were looking at ranking the
24 exchanges, not valuing tokens or estimating
25 liquidity -- estimating asset liquidation discounts?

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1   A. Well, what is relevant to my citation of
2 this paper is that they employed the liquidity
3 measures and then ranked those liquidity measures
4 using different types of data and conclude that the
5 Kyle and Obizhaeva and Amihud 2002 illiquidity
6 ratios perform the best, you know, across most of
7 the dimensions that they consider. And I would
8 pinpoint out that Amihud 2002 model produces higher
9 discounts than the Kyle and Obizhaeva model in my
10 data.
11   Q. That wasn't my question. They were
12 looking at ranking different exchanges, correct?
13   A. Well, the abstract says this paper
14 investigates the efficacy of low frequency
15 transaction-based liquidity measures to describe
16 actual high-frequency liquidity.
17   There's some more text. The Kyle and
18 Obizhaeva 2016 estimator and the Amihud 2002
19 illiquidity ratio outperform when estimating
20 liquidity levels.
21   That is the reason that I cite this paper
22 as one among several reasons to use the KO model.
23   MR. ROSELIUS: Let's take five minutes.
24   (A break was taken.)
25   Q. (By Mr. Roselius) So I want to direct your

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1   attention to page 13 of Brauneis' paper where they
2   talk about comparing the liquidity of different
3   trading venues.
4   Do you see that in Section 3.6?
5   A. Yes.
6   MR. ROSELIUS: Sorry. Can we go off the
7   record for a second?
8   (A discussion was held off the record.)
9   Q. (By Mr. Roselius) So they talk in Section
10 3.6 about ranking exchanges or comparing the
11 liquidity of different trading methods, correct?
12   A. Correct.
13   Q. And they say -- they talk about that by
14 chance, the fraction should be 50 percent. So
15 they're looking at ranking different exchange pairs
16 to see whether each liquidity proxy applies when
17 ranking the different exchanges?
18   A. Yes. That does seem to be this brief --
19 the analysis in this section.
20   Q. And at the bottom of page 14 in the first
21 column, they say, quoting, for the price impact on
22 the other hand, the percentage of matching rankings
23 is lower and is often post 50 percent even for the
24 best performing estimators. The liquidity proxies
25 thus do not provide valuable information on the

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1   ranking of price impacts across different trading
2   venues.
3   Do you know why the KO model was not able
4   to provide valuable information on the ranking of
5   price impacts across different trading venues?
6   A. I do not, and I don't think it's relevant
7   for my use of this paper in my report since I was
8   not using it to rank exchanges.
9   Q. Did you ever try to calculate the two
10 invariance in the KO model based on cryptocurrency
11 data?
12   A. I did test the invariance hypotheses in my
13 model -- in my data to the best extent possible and
14 found results to be broadly consistent, although the
15 data were noisy.
16   Q. What do you mean by broadly consistent?
17   A. So do you have a copy of the KO 2016
18 paper? I can show you the tables we replicated as
19 much as we could.
20   Q. Yeah.
21   (Exhibit 4 was marked for identification.)
22   Q. (By Mr. Roselius) So you've been handed
23 what's been marked as Exhibit 4, and that is a copy
24 of the 2016 KO paper, is that correct?
25   A. Correct.

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1   Q. You were referring to a table. Can you
2   tell me which table you were referring to, after you
3   find it?
4   A. I will. Table 1 on page 1369.
5   Q. And you tried to replicate that table; is
6   that what you said?
7   A. Yes. We show that these moments of volume
8   and volatility exhibit broadly similar patterns. In
9   particular, in Panel A where, for example, the --
10 going from the first decile in the second column to
11 the second decile in the top column, we see the
12 median volatility times price -- volume times price,
13 the average daily volume in millions increasing and
14 the volatility across those columns broadly
15 decreasing.
16   I cannot recall exactly the relationship
17 between our descriptive specifics and theirs, but I
18 do know that we confirmed a broadly similar pattern
19 in the cryptocurrency data as in these descriptive
20 statistics.
21   Q. And that's in your report?
22   A. We did not include it in the report.
23   Q. And why not?
24   A. And we cannot -- yeah. It was -- as I
25 mentioned, the data were noisy. I believe the tenth

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1   decile had relatively higher values compared to the
2   other deciles due to the higher volatility of these
3   assets, and we felt it was useful for us, in
4   validating our decision internally, to use the KO
5   model.
6   And I, in particular, have requested the
7   analysis to ensure that our data performed in a
8   roughly -- you know, roughly consistent with the
9   invariance hypotheses, and I was satisfied that it
10 did. I didn't feel it was important enough to
11 include in the report.
12   Q. You didn't think validating the model on
13 cryptocurrency was important to include in the
14 report?
15   MR. GLUECKSTEIN: Object to the form.
16   A. I see no reason why the model would not
17 apply to the digital asset markets as a general
18 matter, so it did not seem first order to include
19 these tests.
20   Q. (By Mr. Roselius) How do you identify bets
21 for the KO model?
22   A. I'm sorry. Can you clarify? Are you
23 asking what is a bet, or do I see bets in our data?
24   Q. Yeah. The latter. How did you identify
25 the bets to use in the KO model for this opinion?

20 (Pages 74 to 77)

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1 perpetual futures market as part of a strategy
2 involving selling the underlying spot?
3   A. I mean, a hedge fund could certainly take
4 multiple positions in derivative and spot markets at
5 the same time as part of a strategy to maximize
6 value. I mean --
7   Q. Do you know how they would go about doing
8 that, what the strategy would look like?
9   A. Go about doing exactly what?
10   Q. Employing that strategy that you just
11 described.
12   A. No. That was outside the scope of my
13 analysis. I can only -- I can comment on what
14 Mr. Gkatzimas specifically proposed for the debtor,
15 but in general, I -- you know, I did not work on
16 hedging strategies and perpetual futures markets as
17 part of my analysis.
18   Q. If there was a market participant that
19 held a long spot position, they could hedge part of
20 that spot position by taking a short position in the
21 perpetual futures market, right?
22   A. They could hedge against downward pricing
23 events with a short position in perpetual futures
24 markets, yes.
25   Q. And putting on a hedge position in the

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1 perpetual futures market, all else equal would tend
2 to move down the price in the perpetual futures
3 market, right?
4   A. The perpetual futures contracts operated
5 slightly differently in all the different exchanges,
6 but they generally use a funding rate mechanism that
7 incentivizes participants to keep the futures prices
8 close to the underlying spot price.
9   Q. And that's a periodic funding mechanism;
10 it's not constant.
11   A. At FTX, it was every hour.
12   Q. Generally speaking, if you put on a short
13 position, that would tend -- all else equal, putting
14 on a short position would tend to move down the
15 price in the market as opposed to in the futures
16 market?
17   A. In general, yeah.
18   Q. When prices deviate between a spot and
19 futures market, do you know what that's called?
20   A. A price disparity between the spot and
21 futures?
22   Q. Yeah. A spread? Purely terminology.
23   A. Okay.
24   Q. Can we call that a spread?
25   A. Okay.

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1   Q. Are you familiar with a spread arbitrage
2 trade?
3   A. No.
4   Q. If a spot market exists in the absence of
5 a futures market, does that -- let me start over.
6 We'll get there.
7   If you have a spot market on -- if you
8 have a product that you want to spot and there's no
9 futures market, and you have a product that trades
10 spot and there's a future market, all else equal, do
11 you have an opinion on which has more robust
12 liquidity?
13   A. It depends on how well integrated the spot
14 in the futures markets are, so I can't speculate in
15 general. In perpetual futures in cryptocurrencies,
16 there were -- have been times when they are not well
17 integrated, and the prices deviated substantially
18 and other times when they are tightly integrated.
19 For hedging exposure of risk in conventional
20 markets, we generally think about a more liquid
21 market incorporating futures volume.
22   Q. If I trade a product in a spot market that
23 has a future -- let's say it's a robust future
24 market to take away any concerns about the futures
25 market not sufficiently correlating with the spot

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1 market.
2   So if I trade a product in a spot market
3 that has a robust futures market, do those markets
4 interact as one liquidity pool?
5   A. It depends on the goal of the market
6 participant. If the market participant is focused
7 on exposure to price changes, then they do operate
8 as one market whereas if the market participant is
9 interested in exiting a position, then it is the
10 spot market that is relevant to that exercise.
11   And a good example of where we can see
12 that differential is that in the Kyle and Obizhaeva
13 2016 paper, they focus on spot volumes because these
14 portfolio transition trades represent bets to sell
15 positions in the underlying whereas in their 2023
16 paper, some of the price crashes that they seek to
17 model involve traders who were focused on adjusting
18 exposure, like some of George Soros' big trades is I
19 think one example or curve yields in 2008. There,
20 they include both the spot and the futures markets
21 as one whole market because it is an adjustment of
22 price exposure that they are modeling.
23   Q. But your model just takes into account the
24 spot and not like the 2023 model that takes into
25 account the spot and the futures?

35 (Pages 134 to 137)

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1   A. Correct. I use spot volumes.
2   Q. And the 2016 report -- the 2016 K&O
3 article is based on stocks, right; the NASDAQ, and I
4 think there was another exchange?
5   A. New York Stock Exchange.
6   Q. New York Stock Exchange. Are you aware of
7 what the volume is in single stock futures?
8   A. No. I mean, this is like -- can I list
9 off futures volumes for publicly-traded equities?
10 Is that what you're asking?
11   Q. Do you have a sense of what the single
12 stock future volume in the United States was in
13 2023, an order of magnitude?
14   MR. GLUECKSTEIN: Objection. We are now
15 so far now afield from this report, it's becoming a
16 problem, so I suggest we focus on what she's
17 actually offering an opinion on.
18   A. I agree with counsel's assessment.
19   Q. (By Mr. Bacon) Do you have any sense of
20 the magnitude of the single stock futures volume in
21 2023?
22   A. No.
23   Q. Do you have an opinion whether -- back to
24 our example of you have a spot market in one hand,
25 and then you have another hypothetical situation in

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1 which you've got a spot market and a robust futures
2 market.
3   In that situation with a spot market and a
4 robust futures market, do you think that selling in
5 the spot market has less price impact or more price
6 impact than selling in a market where there was only
7 a spot market?
8   MR. GLUECKSTEIN: Objection. This is a
9 hypothetical. We're not talking about anything in
10 particular. We're just asking her to testify about
11 futures markets with no tether to this case. I'm
12 not going to let this go on much longer.
13   Q. (By Mr. Bacon) Imagine that you had a
14 thousand Serum coins, okay, and there was only a
15 spot market. You magically had a thousand Serum
16 coins, and there was a spot market and a perpetual
17 futures market. If you sold those -- in both
18 instances, if you just sold in the spot market,
19 would you expect more or less price impact between
20 those two situations?
21   MR. GLUECKSTEIN: Object to the form.
22   A. My assignment was to consider an orderly
23 liquidation beginning at the petition time, and I
24 would expect that the collapse of FTX would have a
25 negative impact on perpetual futures markets for

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1 Serum, and so I would not expect that volume to
2 persist, and indeed, all of the perpetual futures
3 volume evaporated shortly after the petition date.
4   So to bring us back to the question at
5 hand which is valuating claims to FTX holdings of
6 Serum at the petition time, as I say in my report, I
7 would reasonably expect investor interest in Serum
8 and its perpetual futures to decline following the
9 bankruptcy which it did.
10   Q. (By Mr. Bacon) But your methodology does
11 not take into account post-petition liquidity, is
12 that right?
13   A. That's correct.
14   Q. So I'm going to try this one more time.
15   If I sold an asset in a spot market, all
16 else equal, if there was another situation where
17 there was a spot market and a robust futures market,
18 where would you expect there to be greater price
19 impact?
20   A. I think in general, it would again depend
21 on how well integrated the spot and the futures
22 markets are, so I can't speak without having some
23 concrete example, and I don't think that perpetual
24 futures volume is relevant to liquidating the
25 debtor's holding of Serum starting on the petition

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1 date.
2   Q. If you sell a product in a spot market --
3 here. Let me try it this way.
4   If you sell a product solely in a spot
5 market but there is a futures -- a robust futures
6 market for the same, you know, underlying, does the
7 futures liquidity come into play at all in assessing
8 the price impact on the spot market?
9   A. I think it can. As I mentioned, I agree,
10 for example, with Kyle and Obizhaeva's 2023 decision
11 to include both spot and futures market in their
12 analyses of some of the price crashes that they
13 study in that paper but not all. I think it is a
14 case-by-case question given the traders' motivations
15 in placing the bet.
16   Q. But in your original report, you did not
17 make that assessment one way or the other, correct?
18   A. I made the assessment to include only spot
19 volumes.
20   Q. Did you make a determination not to
21 include futures?
22   A. Yes. I think that's --
23   Q. Was that -- like, did you have a futures
24 date in front of you, you analyzed product by
25 product, and you said I'm not going to do the

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1   futures?
2   A.   When I said case by case, not necessarily
3   asset by asset but rather, strategy by strategy. So
4   the decision to take a long-term position of selling
5   holdings of the underlying with the explicit
6   instructions from the court to exit holdings of
7   digital assets, with that trading idea in mind, I
8   felt that only spot markets were relevant, and that
9   applied across all of the digital assets under my
10 consideration.
11   Q.   Do you agree that if a spot and robust
12 futures market exist that if I shorted a position in
13 the spot market that there would be downward price
14 pressure in the spot market which a trader could
15 arbitrage against the futures market?
16   MR. GLUECKSTEIN: Object to the form.
17 Again, this has no relevance to what we're doing
18 here. You cannot continue to ask her to testify
19 about futures. That has nothing -- you're not tying
20 to the case or anything. You're just asking her
21 opinion. You're just asking her to talk about
22 futures trading and strategies. This has nothing to
23 do with anything.
24   MR. BACON: If you're saying that her
25 opinion has nothing to do with futures trading and

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1   strategy, I will take that representation.
2   MR. GLUECKSTEIN: She explained what she
3   explained as to why futures is not -- was not
4   considered in her report and why she doesn't believe
5   it to be viable. You're asking her about
6   hypothetical trading strategies. She's not here to
7   testify as a trader.
8   Q.   (By Mr. Bacon) Are you here to -- can you
9   testify about futures trading strategies?
10   A.   Futures trading strategies as a general
11 matter are beyond the scope of my analysis for this
12 matter.
13   MR. BACON: Give me -- let me take a
14 break. I think we're done. Just give me five
15 minutes, and then we'll be back.
16   (A break was taken.)
17   EXAMINATION
18 BY MR. GWYNNE:
19   Q.   Good afternoon, Professor Howell. My
20 name's Kurt Gwynne, and my firm, Reed Smith,
21 represents Fondation Elements, Fondation
22 Serendipity, Serendipity Network, Limited, and
23 Liquidity Network, Limited.
24   When you referred to the debtor's holding
25 of tokens, are you distinguishing between what FTX

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1   and Alameda on the one hand hold and what creditors
2   on the other hand hold?
3   A.   When I consider debtor's holdings, those
4   are the assets that I was told the estate has
5   recovered from FTX and Alameda. However, I'm not a
6   lawyer, and I'm not sure exactly what the various
7   subsidiaries of those two entities were holding and
8   how the assets were distributed across them.
9   I was simply given a number for each
10 digital asset representing the quantity of that
11 token in the overall debtor's holdings that is
12 available to be potentially liquidated in order to
13 to make distributions to creditors.
14   Q.   Do you distinguish between tokens held by
15 creditors and tokens held by FTX Trading and its
16 affiliates?
17   A.   I'm not exactly following what you mean by
18 distinguish. I have information about customer
19 scheduled claims. They're not holding the tokens;
20 they have claims to tokens. The debtor is holding
21 tokens that it is instructed to liquidate.
22   Q.   What's the amount of tokens for which
23 creditors have claims against the debtors, and
24 please feel free to refer to your report.
25   MR. GLUECKSTEIN: Are you talking about

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1   the entire estate?
2   MR. GWYNNE: For MAPS and OXY, yes.
3   MR. GLUECKSTEIN: For MAPS and OXY.
4   MR. GWYNNE: Yeah.
5   A.   The at-issue tokens collectively comprise
6   53 percent of the face value of the debtor's
7   holdings which is $9.5 billion, so roughly 4.8
8   billion, but I am not sure I have the exact number
9   in my report.
10   Q.   (By Mr. Gwynne) How many MAPS tokens
11 unlocked do the debtors hold?
12   A.   I don't recall exactly. I -- I have the
13 number 10 billion in my head, but I could be wrong.
14   Q.   Is it in --
15   A.   I know that the debtor's -- the MAPS --
16 the face value of the MAPS holdings was about a
17 billion dollars at petition time price.
18   Q.   So in your report, you don't list the
19 amount of MAPS tokens that the debtor and its
20 affiliates hold, is that right?
21   A.   I don't -- no. I don't think so.
22   Q.   So do you list the face value of the
23 unlocked MAPS tokens that the debtors hold?
24   MR. GLUECKSTEIN: Object to the form.
25   A.   We -- no, we do not report that. We

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1 Q. Have you ever looked at case law to see if
2 courts used CoinMarketCap data?
3   A. I did not.
4   Q. So since you're not aware of the liquidity
5 score, can I assume that you're also not aware of
6 whether using that liquidity score has improved the
7 accuracy of CoinMarketCap's trading volume data?
8   A. I have not seen those data.
9   Q. So you didn't use CoinMarketCap as a
10 source of trading value for MAPS and OXY tokens?
11   A. I did in my rebuttal report but not for my
12 main asset liquidation discounts.
13   Q. What exchanges did you use to determine
14 the trade volume for OXY tokens as of the petition
15 date?
16   A. I used the universe of Coin Metrics
17 exchanges that cover the tokens after removing, as I
18 mentioned earlier, Lbank, ZB, and Local Bitcoins.
19 And as I recall, there are -- there's about six
20 exchanges that cover OXY, but I would have to return
21 to my underlying data material to be sure.
22   Q. Would it refresh your recollection if I
23 said you used Kraken and Bitfinex?
24   A. I believe those are two of them. I
25 believe there are more than two.

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1   Q. What exchanges do you recall?
2   A. Binance is the other one for sure.
3 Gate.io would be another one. Sitting here now, I
4 don't want to misstate anything. I want to return
5 to the backup materials.
6   Q. Well, I don't want you to guess either.
7 I'm just trying to find out what you understand.
8   But to be clear --
9   A. I think it's about six.
10   Q. To be clear, when you mentioned Gate.io,
11 was that for MAPS or for the OXY tokens?
12   A. As I recall now, it's for both, but I -- I
13 would need to go back and look at my backup
14 materials to list off the exchanges.
15   Q. What about MEXC? Do you recall using that
16 as an exchange for either MAPS or OXY tokens?
17   A. Yes.
18   Q. Do you know which one, which token?
19   A. No. Actually, I'm certain it was used for
20 Serum. I can see that in my head, but I don't
21 want to --
22   Q. Do you know --
23   A. -- I don't want to misstate anything here.
24   Q. That's fine.
25   Do you know the quality rating for MEXC on

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1 Coin Metrics?
2   A. I do not.
3   Q. Was there any quality rating below which
4 you didn't go?
5   A. My approach was to try to be as inclusive
6 as possible and not to dig too deep into what
7 percent of volume on the Coin Metrics exchanges
8 might be wash trading, and so I used the entire
9 universe with the exception of three exchanges where
10 Mr. Lu told me they are not trustworthy.
11   So the process did not involve an
12 exchange-by-exchange evaluation which is one reason
13 that I don't recall sitting here exactly which
14 exchanges were used for every asset that I
15 considered because I took the universe of Coin
16 Metrics' API after excluding those three exchanges.
17   Q. And the three you excluded were Lbank, ZB,
18 and what was the third one?
19   A. Local Bits.
20   Q. Local Bits. And is ZB just the letter Z
21 as in zebra and the letter B as in beta?
22   A. Correct.
23   Q. So you weren't looking at Coin Metrics or
24 CoinMarketCap and saying okay, I'm stopping here at
25 this rating of C. Anything below C, I'm excluding.

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1 You didn't do that in this analysis, did you?
2   A. I did not.
3   Q. You excluded only what Mr. Lu said should
4 be excluded, right?
5   A. That's correct. As we discussed earlier,
6 I confirmed unreasonable trading activity on those
7 three exchanges that I excluded.
8   Q. What sources did you use to determine the
9 trade volume of Serum tokens?
10   A. I used all of the exchanges in the Coin
11 Metrics API, again, except for the three we
12 discussed, and I believe the list for Serum which
13 was more widely traded was about 15 exchanges.
14   Q. Did you use Poloniex and Bitbox?
15   A. I don't recall.
16   Q. Do you know if Coin Metrics has a spot
17 market data quality grade for Poloniex or Bitbox?
18   A. Again, I did not use any intensive margin
19 measures of trustworthiness from Coin Metrics
20 besides the instruction from Mr. Lu to exclude the
21 three exchanges that were especially untrustworthy.
22   Q. So you didn't compare the scores for Lbank
23 on Coin Metrics or CoinMarketCap?
24   A. I did not.
25   Q. How long would it have taken you to do

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1 that; 10 minutes?
2   A. I don't think there would be incremental
3 value to the analytical exercise to including the
4 additional exchanges, given what I understand to be
5 the large share of volume on these exchanges that
6 are wash trading.
7   So I felt -- I feel that my approach of
8 including all volume on the Coin Metrics universe is
9 already quite inclusive, and a reasonable
10 alternative approach would be to haircut that volume
11 for estimates of wash trading that pervade the whole
12 industry that have been documented in the academic
13 literature.
14   Q. That wasn't my question.
15   MR. GWYNNE: Can you read my question
16 back, please.
17   (The preceding question was read back as
18 requested.)
19   A. I can't speculate how long it would take
20 to evaluate each exchange.
21   Q. (By Mr. Gwynne) I didn't ask you to
22 evaluate each exchange.
23   A. That's what you said.
24   Q. I'll ask the question again.
25   How long would it have taken you to

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1 compare the spot market data quality grade for Lbank
2 as compared to other exchanges on either Coin
3 Metrics or CoinMarketCap?
4   A. I don't think I've seen spot market
5 quality grades from Coin Metrics for each of their
6 exchanges, but obviously, if I had both of those
7 numbers in front of me, it would be immediate.
8   Q. Now, you criticized Mr. Konstantinidis'
9 use of volume during the 24 hours prior to the
10 petition date, correct?
11   A. Yes.
12   Q. And one of the reasons you criticize his
13 use of that volume during that 24-hour period is
14 because there was a spike in volume that occurred on
15 November 10th, correct?
16   A. The 24 hours before the petition time that
17 he uses is associated with elevated volume relevant
18 to the surrounding periods for the at-issue tokens.
19   MR. GWYNNE: Can you read back my question
20 again, please.
21   (The preceding question was read back as
22 requested.)
23   A. I'm uncomfortable with the word spike
24 which is why I used elevated in my response. I
25 think -- I would want you to define spike.

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1   Q. (By Mr. Gwynne) Well, how do you define a
2 spike in trading volume?
3   A. A large increase that does not persist
4 over time.
5   Q. I mean, when you testified earlier you'd
6 been using the word spike, right? When you talked
7 about --
8   A. Uh-huh.
9   Q. -- volume on exchanges that you find not
10 credible --
11   A. Uh-huh.
12   Q. -- you talked about spikes --
13   A. Yeah.
14   Q. -- right?
15   A. Yeah.
16   Q. What is the minimum increase that
17 constitutes a spike when you use that term?
18   A. I don't have a specific increase in mind.
19   Q. Would a 20 percent increase in traffic
20 constitute a spike?
21   A. It would depend on the dynamics of the
22 asset over time. I do believe that
23 Mr. Konstantinidis' initial volumes are inflated
24 relative to the surrounding periods because of his
25 use of petition day volume where there was a great

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1 deal of selling pressure on these tokens, and thus,
2 heightened trading activity. I don't have an
3 opinion on whether they -- that would exactly be a
4 spike or not.
5   Q. So you're saying that the volume increase
6 in that 24 period [sic] may have been an increase
7 but might not have been a spike, right?
8   A. I don't think that it's material to my
9 opinion --
10   Q. That's not --
11   A. -- about his choice of initial volume.
12   Q. But that's not my question, okay. I
13 understand it's not material to you, but I still get
14 to ask you questions and would respectfully ask if
15 you could read back the question and that you answer
16 what I asked, please.
17   (The preceding question was read back as
18 requested.)
19   A. Looking at Exhibit 5A and 5B of my
20 rebuttal report, what we like to call eyeball
21 econometrics suggests that I would be willing to
22 call period of the 24 hours before November 11th a
23 spike for both MAPS and OXY and very clearly so for
24 Serum.
25   Q. Thank you. That's actually --

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1 do you assume that FTX and Alameda sold all of their
2 OXY and MAPS tokens on the petition date?
3   A. No. I do not assume that.
4   Q. Do you assume they were sold over time?
5   A. The KO model relies on an assumption that
6 market equilibrium leads to a trading strategy in
7 which the position is implemented at what they term
8 a natural speed of trading that balances desire for
9 fast execution with a desire to minimize transaction
10 costs. The KO model does not produce a time to
11 liquidation, and that also is not part of my
12 analysis.
13   Q. So your analysis doesn't assume any
14 particular time period associated with the sales
15 that result in the asset liquidation discount?
16   A. Correct.
17   Q. With respect to the Ghaidarov discount
18 model, do you agree that at higher volatilities, the
19 model produces a discount that is too large?
20   A. No.
21   Q. The term free float; does that refer to
22 the amount of tokens that are actually available for
23 trading in the marketplace?
24   A. Yes.
25   Q. Does the amount of coins in the free float

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1 affect the trading volume?
2   A. Not necessarily.
3   Q. So if the free float is, say, three
4 percent of the maximum supply of tokens, do you
5 think it's fair to say that the trading volume would
6 increase in the future as tokens are unlocked?
7   A. Not necessarily. Trading volume reflects
8 market participant interest in buying and selling
9 the token, not how many tokens there are available
10 to sell.
11   Q. Have you looked at other mature tokens and
12 how trading volume reacted when additional tokens
13 were unlocked?
14   A. I have not.
15   Q. Why not?
16   A. I don't think it is relevant to my
17 analysis for this matter.
18   Q. Why not?
19   A. Because all of the debtor's holdings are
20 unlocked, and I was asked to consider the impact on
21 the price in the liquidation commencing at the
22 petition date of all of those unlocked tokens.
23   Q. How did those tokens miraculously become
24 unlocked?
25   MR. GLUECKSTEIN: Object to the form.

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1   MR. GWYNNE: Let me withdraw the question.
2   Q. (By Mr. Gwynne) When you say all the
3 debtor's tokens were unlocked, do you mean that they
4 technically had been unlocked according to their
5 scheduled time to be unlocked, or do you mean
6 something else?
7   A. My knowledge is limited to the information
8 I have from the debtor that it controls a set of
9 digital assets and that all of those assets are
10 available to be liquidated.
11   What may be driving this confusion is that
12 there were tokens that were locked from the
13 customer's perspective, for example, with tickers
14 like MAPS locked, but it was FTX that controlled
15 those token lockup schedules and could unlock them
16 at will, very similar to how employees at
17 conventional companies are compensated with, for
18 example, restricted stock units or options that have
19 vesting schedules, and the company controls those
20 shares. But from the employees' perspective, they
21 are quote, unquote locked.
22   Q. How do you know the debtor could unlock
23 tokens at will?
24   A. My understanding is that all of the
25 holdings that I am considering in my analysis are

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1 unlocked from the debtor's perspective.
2   Q. You said the debtor could unlock them at
3 will. I'm asking what you base that on.
4   A. I'm not saying they were ever locked from
5 the debtor's perspective. I have no information on
6 that.
7   Q. Well, what information do you have on the
8 debtor being able to unlock tokens at will?
9   A. Again, I don't have information on whether
10 tokens were unlocked --
11   Q. You said they --
12   A. -- on the debtor's side, so I don't know
13 whether they have the ability to unlock tokens or
14 not --
15   Q. Okay.
16   A. -- because I don't know if they have
17 locked tokens, from their perspective.
18   Q. Fair enough. So just to be clear, you
19 don't have any information as to whether the debtor
20 has the ability to unlock tokens at will?
21   A. In general, no.
22   Q. Would you agree with -- are you aware that
23 researchers have said that it's reasonable to avoid
24 price drops for individual stocks to be sold by
25 restricting quantities traded to not more than five

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1 or ten percent of daily volume?
2   A. That is certainly a strategy for
3 increasing prices.
4   Q. We talked earlier -- not you and I.
5 Sorry. You answered questions earlier about whether
6 MAPS or OXY tokens become zero instantaneously or
7 whether they become discounted to zero over time.
8   Do you remember that?
9   A. Yes.
10   Q. And do you have any opinion on how many
11 tokens can be sold on a daily basis for how long
12 before the MAPS tokens are discounted to zero?
13   A. I have not -- do not have a specific
14 number in mind, but as I said earlier, my
15 expectation is that the number is trivial relative
16 to total debtor holdings of these assets.
17   Q. Well, trivial in relation to 992 million
18 at face value can still be a large number, right?
19   A. My estimate suggests that if the debtor
20 were to start selling these holdings, the price
21 would go to zero very quickly such that while there
22 would be potentially positive value from initial
23 tokens, as a fraction of total face value, it would
24 be so small as to round down to zero in a meaningful
25 approximation.

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1   Q. Well, again, you're not saying anything
2 different than what you said earlier on that, are
3 you?
4   A. No. I would not have changed my opinion.
5   Q. Did you ever hear of the rational choice
6 theory? You're not familiar with that?
7   A. I'm not familiar with that.
8   Q. It's economic theory that assumes rational
9 behavior.
10   A. I'm certainly familiar with the concept
11 of, you know, rational behavior in markets.
12   Q. Doesn't traditional finance theory assume
13 that both the investor and the market are rational?
14   A. Not all economic and finance theory.
15   Q. Of course not. But doesn't traditional
16 finance theory assume that both the investor and the
17 market are rational?
18   MR. GLUECKSTEIN: Object to the form.
19   A. No. I don't think so. Key assumptions,
20 for example, around no arbitrage don't require every
21 investor to be rational.
22   Q. (By Mr. Gwynne) Do your theories in your
23 research work, are they predicated on rational
24 markets and rational behavior?
25   A. Not necessarily.

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1   Q. So some of your work is based on just an
2 irrational market and irrational actors?
3   A. I don't know that any of my work
4 specifically relies on -- I mean, especially this
5 work. Yeah. I'm -- I'm sorry. How is that
6 relevant?
7   Q. I'm sorry, but I'm asking the questions.
8   A. Okay.
9   Q. You just get to answer them. Sorry.
10   Can you answer the question? I mean, in
11 your work, do you -- well, in your work on this
12 case -- let's start with that -- did you make any
13 assumptions about the market acting irrationally?
14   A. I don't believe so.
15   Q. Did you make any assumptions about the
16 debtor or anyone else acting irrationally?
17   A. No.
18   Q. So did you make assumptions that the
19 market and the debtor would react rationally?
20   A. The models that I used, both the discount
21 for lack of marketability and the asset liquidation
22 discount, rely on markets being in equilibria where
23 arbitragers address mispricings. However, they
24 don't rely on assumptions about the rationality of
25 every market participant.

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1   Q. Again, I didn't say every market
2 participant.
3   A. Well, I don't have anything to say about
4 the rationality of market participants.
5   Q. When you determined the discounts for the
6 MAPS and OXY tokens, did you make any assumptions
7 about whether the debtor or the creditors would act
8 reasonably in liquidating assets?
9   A. Yes. I assumed that liquidation would
10 proceed in an orderly manner, and I interpreted that
11 to align with the notion of a natural speed of
12 trading as described in the Kyle and Obizhaeva
13 model.
14   Q. Well, why would you assume liquidation
15 would proceed in an orderly manner?
16   A. Because that was part of my assignment.
17   Q. Did that make sense to you?
18   A. Yes.
19   Q. Why?
20   A. I have no reason to believe that Mr. John
21 Ray and his team would wish for an disorderly
22 liquidation.
23   Q. Would that be rational?
24   A. I think it would be -- I mean, I think I'm
25 perhaps going beyond my -- the purview of my work